

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application.

1-22. (canceled)

23. (new) An initiator system for initiation of a radical polymerization of a preparation comprising at least one of monomers and oligomers which include ethylenic unsaturated groups, said initiator system comprising:

an open-chain and/or cyclic N,N-diacylhydroxylamine of the general formula R-CO-N(OH)-CO-R', wherein R and R' are selected from the group of aliphatic, linear, branched and/or cyclic and/or aromatic hydrocarbons and R and R' may be linked with each other forming a ring, and

co-initiators which contain metal ions with multiple oxidation levels in the range of from 1 to 8 or tertiary amines.

24. (new) An initiator system according to Claim 23, wherein R, R', R'' and/or R''' are hydrocarbon chains with a chain length of 2 to 18 atoms.

25. (new) An initiator system according to Claim 24, wherein the group X is comprised of an alkyl residue with 1 to 6 C atoms or an aliphatic, aromatic or heteroaromatic acyl residue with at least 2 C-atoms.

26. (new) An initiator system according to Claim 23, wherein the co-initiator contains metal ions from the group Ti, V, Cr, Mo, W, Mn, Fe, Co, Rh, Ir, Ni, Pd, Pt and/or Cu.
27. (new) An initiator system according to Claim 26, wherein the co-initiator contains metal ions from the group alkali, earth alkali as well as Bi, Pb and/or Ce.
28. (new) An initiator system according to Claim 23, wherein the residues R and R' are linked to form a chain of from 2 to 10 atoms.
29. (new) An initiator system according to Claim 23, wherein the residues R and R' contain at least one hetero atom from the group N, O and S and are joined to each other, so that a cyclic N,N-diacylhydroxylamine or N,N-diacylhydroxylamine derivative with a ring size of 5 to 12 atoms is formed.
30. (new) An initiator system according to Claim 23, wherein the residues R and R' form a closed ring system with 5 to 12 ring atoms, to which the N,N-diacylhydroxylamine group, or the derivative thereof, is joined via their acyl groups.
31. (new) An initiator system according to Claim 23, wherein the cyclic N,N-diacylhydroxylamine or the derivatives thereof are formed by N-hydroxyl-phthalimide, N-

hydroxylmaleimide or hydroxamic acid and/or N-hydroxylsuccinimide.

32. (new) An initiator system according to Claim 23, wherein the initiator system includes air or O₂.
33. (new) An initiator system according to Claim 23, wherein the radical initiator system includes additional radical initiators on the basis of peroxides, azo compounds or C-C-bond splitting initiators.
34. (new) An initiator system for initiation of a radical polymerization of a preparation comprising at least one of monomers and oligomers which include ethylenic unsaturated groups, said initiator system comprising:

open-chain and/or cyclic O-alkylated or O-acylated N,N-diacylhydroxylamine of the general formula R-CO-N(OH)-CO-R', and

co-initiators which form a complex with metal ions with multiple oxidation levels in the range of from 1 to 8, wherein X represents -H, -R'' or -CO-R''' and R, R', R'' and R''' are the same or different organic substituents selected from the group of aliphatic, linear, branched and cyclic, substituted or unsubstituted hydrocarbon, and aromatic hydrocarbons, and R and R' can be joined to each other to form a ring.

35. (new) An initiator system according to Claim 33, wherein the metal ions are selected from the group of the transition metals and are oxidizable by atmospheric oxygen and reducible by N,N-diacylhydroxylamine.
36. (new) A process for initiation of a radical polymerization of polymerizable compounds with ethylenic unsaturated groups under the influence of oxygen, comprising substantially thermal initiated polymerization by formation of oxyl-radicals of open-chain and/or cyclic N,N-diacylhydroxylamines or their O-alkyl or O-acyl derivatives with the general formula R-CO-N(OH)-CO-R', R-CO-N(O-R'')-CO-R' or R-CO-N(O-CO-R''')-CO-R', with the aid of co-initiators, which include metal ions with multiple oxidation levels in the range of 1 to 8, wherein R, R', R'' and R''' mean the same or different organic substituents selected from the group aliphatic, aromatic, linear, branched and cyclic, substituted and unsubstituted hydrocarbon, wherein R and R' may be joined to each other to form a ring.
37. (new) A process according to Claim 36, wherein the formation of the oxyl radical is coupled with the reduction of metal ions of a co-initiator from a higher into a lower oxidation level.

38. (new) A process according to Claim 37, wherein metal salts are employed as co-initiator, of which the metal ions can be transitioned by N,N-diacylhydroxylamine from a higher to a lower oxidation level.
39. (new) A process according to Claim 36, wherein the residues are organic residues, wherein R, R', R'' and/or R''' are aliphatic or, with the exception of R'', aromatic, and can contain hetero atoms.
40. (new) A process according to Claim 36, wherein the temperature for initiation is below 150°C.
41. (new) A process according to Claim 36, wherein the oxygen content in the gas environment of the polymerizable compound lies in the range of 25 to 0.01 Vol.%.
42. (new) A process according to Claim 36, wherein the preparation contains a UV-initiator and prior, during or subsequent to the initiation of the thermal initiated polymerization is partially irradiated with energy rich light or UV-light.